DOCUMENT RESUME

ED 270 982 FL 015 743

AUTHOR Bermudez, Andrea
TITLE Examining the Effects of Home Training on Problem-Solving Styles.
PUB DATE 86
NOTE 17p.; Paper presented at the Annual Meeting of the Teachers of English to Speakers of Other Languages (20th, Anaheim, CA, March 3-8, 1986).
PUB TYPE Reports - Research/Technical (143) -- Speeches/Conference Papers (150)

EDRS PRICE MF01/PC01 Plus Postage.
DESCRIPTORS *Cognitive Style; *Cultural Context; *Family Influence; Family Life; *Hispanic Americans; *Home Schooling; Outcomes of Education; *Problem Solving; Skill Development

ABSTRACT

A study examined the possible differences in home training received by Hispanics and Anglos, the development of particular problem-solving styles as a result of home training, and possible differences between Hispanics and Anglos in problem-solving styles. A questionnaire was used to investigate home teaching style, actualization of home-encouraged problem-solving styles, and self-perceived achievement and/or degree of difficulty in learning science and math. Two nonverbal intelligence subtests were also used to measure inductive problem-solving style. Results indicate a significant difference in problem-solving behaviors encouraged in Hispanic and Anglo homes, namely that Anglo homes tend to encourage analytic and self-dependent skills more often than Hispanic homes. It is suggested that the relative breadth of cognitive skills use encouraged in the home and the use of an analytic versus a global format in teaching strategies may be more influential in academic failure among Hispanics than language skills. It is concluded that learners need to be exposed to analytic and global problem-solving behavior to ensure the development of alternative styles in approaching learning tasks successfully. (MSE)

****
* Reproductions supplied by EDRS are the best that can be made *
* from the original document. *
****

ED270982

Examining the Effects of Home Training on Problem-Solving Styles

Andrea Bermúdez, Ed.D
University of Houston-Clear Lake

"PERMISSION TO REPRODUCE THIS MATERIAL HAS BEEN GRANTED BY

Andrea B. Bermudez

TO THE EDUCATIONAL RESOURCES INFORMATION CENTER (ERIC)."

U.S. DEPARTMENT OF EDUCATION
Office of Educational Research and Improvement
EDUCATIONAL RESOURCES INFORMATION CENTER (ERIC)

☒ This document has been reproduced as received from the person or organization originating it.

☐ Minor changes have been made to improve reproduction quality.

• Points of view or opinions stated in this document do not necessarily represent official OERI position or policy.

Summer 1986

FL015743

Examining the Effects of Home Training on Problem-Solving Styles

Theoretical Framework

For the past two decades, research has been suggesting that socialization practices (i.e., cultural influences on human behavior) have an effect on the cognitive styles exhibited by individuals (Dershowitz, 1971; Ramirez & Price-Williams, 1974a; Witkin, 1967). More specifically, research has found that differences in cultural background may account for differences in intellectual skills or in patterns of intellectual performance (Beman, 1972; Kaplan, 1980; Stodolsky & Lesser, 1967). It has also been reported that field-independent learners (i.e., analytic learners with an internal locus of control) tend to perform better in inductive type test items (Stansfield & Hansen, 1983; Witkin, Dyk, Goodenough & Karp, 1962) than the field-dependent counterparts (i.e., global learners with an external locus of control). Canavan (1969) and, again, Ramirez & Price-Williams (1974a) found that tradition-oriented Mexican Americans scored in a significantly more field-dependent direction than the Anglos in their studies. In addition, Gitlitz & Kautman (1972) found that whites perform significantly better than either Mexican American or Blacks in test items which required inductive reasoning.

Language deficits of the second language learner,

however, have consistently been identified by researchers as the most important factor fostering bias in instruction and testing (d'Anglejan, Gagnon, Hafez, Tucker & Winsberg 1979; Henessy, 1974; Sattler, 1982). Swanson & De Blassie (1971), nevertheless, found no significant differences in test performance using the Wechsler Intelligence Scale for Children (WISC) if directions were given in Spanish. Emphasis on language as the dominant source of conflict in problem solving events disregards the possibility of differing problem solving styles among culturally different learners.

The role of the home has recently been cited as having a significant effect on children's language development (Henderson & Garcia, 1973); on school achievement (Klaus & Gray, 1968; Schaefer, 1972; Walberg, 1984); on improvement of overall school behavior (Levenstein, 1974; Weikart, 1973); and on maintaining achievement gains (Gray & Klaus, 1970). Additionally, the effects of home learning on children's cognitive styles was studied by Laosa (1981) who found that mothers tend to stimulate in their children the development of cognitive styles similar to their own. Effects of family training were also studied by Ramirez (1967) and, again, by Ramirez and Castaneda (1974) who found that Mexican-American homes significantly emphasized conformity and family solidarity and that these individuals tended to respond to adult and family expectations rather than to self-directed goals.

Research Questions and Hypotheses

Three research questions emerge from the previous review of the literature:

(1) Are there differences in the home training received by Hispanics and by Anglos?

(2) Do individuals develop a particular problem solving style as a result of early home training? and

(3) Is there a difference between the Hispanics and the Anglos with regards to problem solving styles?

Supported by the studies cited in the review of literature hereto presented, three directional hypotheses guided this study: (1) there is a significant difference between behaviors taught in Anglo and Hispanic homes, (2) there is a significant positive relationship between home training and actual behaviors exhibited by individuals, and (3) there is a significant difference in problem solving styles between Hispanics and Anglos.

Methodology and Instrumentation

The "Home Training Survey" was administered to a sample of 129 preservice and inservice school personnel. The instrument is a 17-item Likert scale questionnaire. An estimated reliability coefficient of 0.81 was obtained using the Kuder-Richardson 20 formula. All 17 items have significant discriminating power, ranging from 0.34 to 0.61. Experts in the field have established its content validity.

Three constructs are identified in the questionnaire: (1) home teaching style, (2) actualization of home-encouraged problem-solving styles, and (3) self-perceived achievement and/or degree of difficulty in learning science and math. More specifically, home teaching style addresses home encouragement of: (1) self-dependent behaviors, (2) independence of opinion and choice, and (3) inquiry skills. Actualization of the individual's problem-solving style refers to the extent to which the subject exhibits any of the home-encouraged problem solving behaviors. Lastly, self-perceived achievement and/or degree of difficulty in learning science and math explicitly address how the individual rates his/her ability to acquire competence and/or level of performance in science and math areas.

In addition to this instrument, two non-verbal subtests (i.e., the Block Design and the Object Assembly) from the Wechsler's Adult Intelligence Scales-Revised (WAIS-R) were administered to 84 participants from the sample used above. According to Sattler (1982), the Block Design is the subtest with most cross-cultural validity. Among the abilities measured by this subtest, the following are included: (1) abstract conceptualizing ability, (2) ability to analyze and synthesize, (3) speed in sizing up a problem, and (4) ability to relate parts to whole. More explicitly, the test measures inductive problem solving styles. This subtest also requires a deliberate, persistent, and careful problem-solving

approach (Matarazzo, 1979). Additionally, the Object Assembly subtest measures: (1) the ability to perceive a whole with understanding of its component parts, (2) ability to synthesize concrete parts into meaningful wholes, and (3) successful trial and error techniques. Although this subtest cannot be considered an entirely deductive measure, the fact that the goal is concrete (i.e., making the pieces look like a human figure, a face, a hand, and an elephant) allows the problem solver to perceive the whole almost immediately (Matarazzo, 1979).

T-tests of significance were used for mean comparisons with respect to constructs identified in the survey. In addition, analyses of covariance (ANCOVA) were performed to to statistically control main effects of intervening variables. Lastly, the Pearson's product moment correlation coefficient was calculated to measure the degree of relationship between variables. The findings are reported in the following section.

RESULTS

The Pearson's product moment correlation coefficient was calculated to measure any possible relationships between the effects of home training and the actualization of behavior. A significant positive relationship ($r=.71$, $p<.001$) was obtained. The Block Desing inductive subtest was also found to be positively correlated ($r=.28$, $p<.01$) with the construct identifying the home-encouraged behaviors.

Furthermore, this subtest is positively correlated with the actualized behaviors (r=.41, p<.001) as measured by the "Home Training Survey" (refer to Table 1). These results seem to suggest that behaviors encouraged at home tend to be exhibited by individuals who were brought up in those homes. This particular finding is critical in the light of current research focusing on the importance of educating parents and teachers in order to develop a home-school partnership to support children's learning (Bermudez & Padron, 1985, 1986a, 1986b). If parents and/or teachers become aware that their teachings might be in conflict with what is taught at home or at school, a more continuous plan of action can be drawn to facilitate learning. This fact has definite implications for the linguistic, cognitive, and cultural development of individuals.

Insert Table 1 here.

A t-test of significance was used to compare mean differences between 56 Hispanics and 28 Anglos with respect to: (1) their home training experience, (2) their actualization of home-encouraged behaviors, and (3) their self-perceptions of degree of difficulty and/or achievement

in science and math using the three constructs identified in the "Home Training Survey." Anglos (M=24.60) were significantly ($p<.001$) more encouraged to develop analytic, self-dependent problem-solving styles than Hispanics (M=22.11). It was also found that Anglos (M=27.66) tend towards actualizing these behaviors significantly more frequently ($p<.01$) than Hispanics (M=25.64). No significant differences were found in self-perceptions of success and/or degree of difficulty in math and science between the two samples (refer to Table 2).

Insert Table 2 here.

In order to further examine the differences between Anglos and Hispanics with respect to problem solving styles, the two non-verbal subtests from the WAIS-R described in the previous section were administered to the same sample of Hispanics and Anglos. An ANCOVA was used to statistically control the subjects' level of education as well as their length of residence in the U.S. It was found that after the effects of those two variables had been removed, ethnicity had a statistically significant effect ($p<.01$) on the degree of success in solving the Block Design tasks of the WAIS-R

(refer to Table 3). A mean comparison between Hispanics ($\underline{M}$=8.96) and Anglos ($\underline{M}$=10.86), reflecting their performance in this subtest, is suggestive of a greater tendency of Anglo subjects to succeed at inductive tasks which involve abstract goals, careful strategizing, and perseverance (Matarazzo, 1979). Further, an ANCOVA was also used to statistically control the subjects' level of education as well as their length of residence in the U.S. in measuring the effects of ethnicity on solving the tasks posed in the Object Assembly subtest of the WAIS-R. No significant differences were found. The smaller mean difference between the two groups, however, may be indicative of the Hispanics' increased ability to better solve problems that have a more concrete goal (refer to description of the subtest in the previous section) than those which require abstract conceptualization. In addition, this subtest also facilitates the instant perception of the whole picture which may also suggest an increased ability on the part of the Hispanics in this sample to solve global problems rather than part-specific ones.

Insert Table 3 here.

Summary and Implications

The present study has found that there is a significant difference between problem solving behaviors encouraged at Anglo and Hispanic homes. More specifically, Anglo homes tend to encourage analytic and self-dependent skills more often than Hispanic homes. The instructional implications of these findings are manifold due to the fact that American classrooms, for the most part, emphasize self-dependence and part-specific thinking skills in their testing and learning activities (e.g., "fill-in the blanks," puzzle solving, "complete the picture,"" matching," "Cloze" procedure, among others). In addition, it has been reported that analytic cognitive style-field independent behavior is a significant predictor of standardized achievement scores (Tucker, Hamayan & Genesee, 1976; Naiman, Frohlich & Todesco, 1978) and of foreign language aptitude (Carroll & Sapon, 1958).

Since home training has been found to have a significant effect in the type of problem solving behavior exhibited by the subjects in this study, it is imperative that homes expand their knowledge base of cognitive skills to be developed in children so that the latter can respond successfully to classroom instruction. School-based parental education programs could serve to activate this process (Bermudez & Padron,1985, 1986a, 1986b). Furthermore, schools should become cognizant of the differences in and effects of home-encouraged problem solving styles in order to hasten children's transition from the home to the school setting.

Another important indication suggested by the results of

this study is that the type of problem solving style exhibited by the individual may be at play in the successful solution of either analytic or global instructional tasks. Traditionally, linguistic bias has been identified as the immediate cause of failure in the academic performance of language minority children. The non-verbal tasks used in this study, however, redirect the attention to the role of analytic versus global formats in teaching strategies and in testing instruments rather than to the content or the language medium used.

In conclusion, the findings of this study underscore the need to provide learners with an exposure to analytic and global problem solving behavior in order to ensure the development of alternative styles in approaching learning tasks successfully.

References

Beman, A.T. (1972). Piagetan theory examined crossculturally Unpublished doctoral dissertation. Rice University, Houston, Texas.

Bermudez, A. & Padron Y.N. (1985). An evaluation of an educational program for parents of minority children. In Rose Duhon (Ed.), Reflections of Multicultural Education in the 80's, Volume I. Lafayette, La: Mc Neese State University, 35-49.

Bermudez, A. & Padron, Y.N. (1986a, January). Teacher and parents as partners. Paper presented at the annual conference of the Southwest Educational Research Association, Houston, Texas.

Bermudez, A. & Padron Y.N. (1986b, April). Developing an educational program for language minority parents: A needs assessment. Paper to be presented at the National Association for Bilingual Education, Chicago, IL.

Canavan, D. (1969). Field dependence in children as a function of grade, sex, and ethnic group membership. Paper presented at the meeting of the American Psychological Association, Washington, D.C.

Carroll, J.B. & Sapon, M. (1958). Modern language aptitude test. New York: The Psychological Corporation.

Collison, G. (1974, August). Concept formation in a second language: A study of Ghanaian school children. Harvard Educational Review, 44 (3), 441-457.

d' Anglejan, A., Gagnon, N., Hafez, M., Tucker, G.R. & Winsberg, S. (1979). Solving problems in deductive reasoning: Three experimental studies of adult second language (ERIC Document Reproduction Service No.ED 169 773).

Dershowitz, A. (1971) Jewish subcultural patterns and psychological differentiation. International Journal of Psychology 6 (3), 223-231.

Gitlitz, A.H. & Kautman, N.L. (1972, June). Project Access Research Report No.4: Influence of race, sex, and city on inductive reasoning items. Princeton, N.J.: Educational Testing Service.

Goodenough, D.R. & Witken, H.A. (1977). Origens of the fiel-dependent and field-independent cognitive styles Princeton, N. J.: Educational Testing Service (ETS RB77-9).

Gray, S., & Klaus, R. (1970). The early training project: A seventh year report. Child Development, 41, 909-924.

Hennesy, J.J. (1974). Structure and pattern of mental abilities in several ethnic and sex groups. Dessertation Abstracts International, 35, 2769.

Henderson, R.W. & Garcia, A.B. (1973). The effects of a parent-training program on question-asking behavior of Mexican-American children. American Educational Research Journal, 10, 193-201.

Kaplan, R.B. (1980). Cultural thought patterns in inter-cultural education. In K. Croft (Ed.) Readings on English as a second language. Massachussetts: Winthrop, 399-418.

Klaus, R.A. & Gray, S.W. (1968). The educational training program for the disadvantaged children - a report after five years. In Monographs of the Society for Research in Child's Development. Chicago: University of Chicago Press, 33.

Laosa, L.M. (1981). Maternal teaching strategies and cognitive styles in chicano families. In R.P. Duran (Ed). Latino Language and communicative behavior. New Jersey: Ablex Publishing Co., 295-309.

Levenstein, P. (1974). A message from home: A home-based intervention method for low income preschoolers. (Eric Document Reproduction Service No. ED 095 992).

Matarazzo, J.D. (1979). Wechsler's Measurement and Appraisal of Adult INtelligence. New York: Oxford University Press.

Naiman, N., Frohlich, M., Stern, H.H. & Todasco, A. (1978). The good learner. Research in Education Series 7. Toronto: Ontario Institute for Studies in Education.

Ramirez, M. (1967). Identification with Mexican family values and authoritarianism in Mexican-Americans. The Journal of Social Psychology. 73, 3-11.

Ramirez, M. & Castaneda, A. (1974). Cultural democracy, bicognitive development, and education. New York: Academic Press, Inc.

Ramirez, M. & Price-Williams, D.R. (1974). Cognitive styles of children of three ethnic groups in the United States. Journal of Crosscultural Psychology 5 (2).

Sattler, J.M. (1982). Assessment of children's intelligence and special abilities. Mass: Allyn and Bacon, Inc.

Schaefer, E.S. (1972, April). Parents as educators: Evidence from crossectional, longitudinal, and intervention research. Young Children, 227-239.

Stansfield, C. & Hansen, J. (1983, March). Field dependence-indepence as a variable in second language cloze test performance. Tesol Quarterly 17 (1), 29-38.

Stodolsky, S.S. & Leser, G.S. (1967, Fall). Learning patterns in the disadvantaged. Harvard Educational Review, 37 (4), 546-593.

Swanson, E. & De Blassie R. (1971). Interpreter effects on the WISC performance of first grade Mexican-American children. Measurements and Evaluation in Guidance 4, 172-175.

Tucker G.R., Hamayan, E. & Genesee, F. (1976). Affective, cognitive and social factors in second-language acquisition. Canadian Modern Language Review 32 (3), 214-226.

Walberg, H.J. (1984, February). Families as partners in educational productivity. Phi Delta Kappan, 65 (6), 397-400.

Weikart, D. (1973). Development of effective preschool programs: A report on the results of the high/scope-Ypsilanti preschool projects. Ypsilanti, Mich: High Scope Research Foundation.

Witkin, H.A., Dyk, R.B., Faterson, H.F., Goodenough, D.R. & Karp, S.A. (1962). Psychological differentiation. New York: Wiley.

Witkin, H.A. (1967). A cognitive style approach to cross-cultural research. International Journal of Psychology, 2 (4), 223-250.

Table 1 : Product-Moment Correlation		
	Actualization	Block design
Home training	.71***	.28 **
Block design	.41***	1.00

Table 2 : t-test on differences between Anglos and Hispanics in home training, behavior actualization, and self-rating on performance and degree of difficulty in science and math

	Hispanics (N=56) M	Anglos (N=28) M	t
Home training	22.11	24.60	4.02***
Actualization of home-encouraged behaviors	25.64	27.66	2.81**
Self-rating on performance degree of difficulty in science and math	13.38	13.77	.57

*** p< .001
** p< .01

Table 3 Analysis of Covariance: Effects of ethnicity on problem solving by education level and length of residence

Source	df	Ms	F
RES	1	52.98	9.84**
EDUC	1	3.25	.60
Main Effects ethnic	1	54.61	10.13**
Explained	3	39.10	7.26***

** p< .01
*** p< .001